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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,643	12/21/2001	Yoshiharu Aruga	Q67848	2776

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EXAMINER

MOUTTET, BLAISE L

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 04/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/024,643

Applicant(s)

ARUGA ET AL.

Examiner

Blaise L Mouttet

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-10 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. The English language translation of the priority document JP2000-389223 filed in Japan on December 21, 2000 removes EP 1 097 814 as a prior art reference.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Cook US 6,155,664.

Cook discloses, regarding claim 1, an ink jet recording apparatus comprising:
a recording head (24) mounted on a carriage, the recording head being reciprocally movable in a width direction of a recording sheet (column 5, lines 36-41);
and

a sub-tank (4) for supplying ink to the recording head (24) from an ink cartridge (10), wherein the sub-tank (4) is mounted on the carriage with the recording head (24) (figure1, column 5, lines 42-53), the sub-tank (4) comprising:

an ink level detector (30a, 30b) configured to detect at least a low ink state in which quantity of ink stored in the sub-tank is smaller than a predetermined value, and a

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full ink state in which the quantity of ink stored in the sub-tank reaches the predetermined value (column 12, lines 8-21), and

an ink consumption counter (36) configured to acquire the total quantity of ink ejected or discharged by the recording head (24) (column 11, line 65 - column 12, line 7),

wherein the ink level detector (30a, 30b) and the ink consumption counter (36) are configured to operate simultaneously (as disclosed in relation to the embodiment of figure 6, steps 158 and 160 in which both sensing methods are performed simultaneously and compared to determine if the sensors are working properly), and

wherein the ink cartridge (10) is configured to supply ink to the sub-tank (4) (figure 6, step 178), when the ink level detector (30a, 30b) detects the low ink state (figure 6, step 158, column 14, lines 38-44) and the value acquired by the ink consumption counter (36) reaches a predetermined count value (figure 6, step 164, column 15, lines 15-20).

Regarding claim 3, ink supply valve (5) is disposed along ink supply path (6,7) extending from the ink cartridge (10) to the sub-tank (4) to supply ink when opened (column 5, lines 56-65).

Cook discloses, regarding claim 8, an ink supply method of controlling supply of ink to a sub-tank (4) of an ink jet recording apparatus which comprises a recording head (24) which is mounted on a carriage and is reciprocally moved across the width of a recording sheet (column 5, lines 36-41), the sub-tank (4) to which ink from an ink cartridge (10) is supplied and from which ink is supplied to a recording head (24)

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(column 5, lines 42-53), an ink level detector (30a, 30b) for detecting the quantity of ink retained in the sub-tank (4) (column 12, lines 8-21), and an ink consumption counter (36) for calculating as a count value, total quantity of ink ejected or discharged by the recording head (24) (column 11, line 65 - column 12, line 7), the method comprising the steps of:

detecting the quantity of ink stored in the sub-tank (4) by the ink level detector (30a, 30b) (figure 6, step 158, column 14, lines 38-44);

referring to the count value acquired by the ink consumption counter (36) and determining whether the referred value reaches a predetermined count value where a low ink state in which the quantity of ink stored in the sub-tank (4) is smaller than a predetermined value (figure 6, step 164, column 15, lines 15-20);

supplying ink from the ink cartridge (10) to the sub-tank (4) (figure 6, step 178) when the ink level detector detects the low ink state (figure 6, steps 158-164) and the referred value reaches the predetermined count value (figure 6, steps 158-164),

wherein, the detecting and referring steps are performed simultaneously (the reference to the count value is performed simultaneously to the detection in step 158 so that the ink levels determined by the two methods may be compared and used to determine the functionality of the sensor as explained in column 14, lines 38-59).

Regarding claim 9, the ink transfer from ink cartridge (10) to sub-tank (4) continues until the sub-tank is full (column 13, lines 36-55) and the transfer is disabled when the sub-tank is refilled (figure 6, step 192, column 16, lines 27-31).

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Regarding claim 10, the count value of the sub-tank (4) is reset upon refill (figure 6, step 196, column 16, lines 39-44).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook US 6,155,664 in view of Kobayashi et al. EP 841 173.

Cook discloses an ink jet recording apparatus as described in claim 1 as noted in the above 35 USC 102 rejection.

Cook fails to disclose, regarding claim 2, that the predetermined count value used to determine maximum ink consumption in the ink sub-tank is obtained by taking into account the amount of ink consumed in a cleaning operation.

Cook fails to disclose, regarding claim 7, assigning coefficients and performing a multiplication process to determine ink consumption with the ink quantity counter.

Kobayashi et al. discloses that when performing ink consumption calculation using a drop counter the ink consumed during cleaning operations must be taken into account in order to attain a proper ink level value (page 2, line 38 - page 3, line 2, abstract) and providing a coefficient setting device (37) to assign coefficients to properly

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determine the amount of ink consumed by performing a multiplication process (column 4, lines 48-54).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to set the predetermined count value used to determine maximum ink consumption in the ink sub-tank of Cook by taking into account the amount of ink consumed in a cleaning operation and assign coefficients for performing a multiplication process to determine ink consumption with the ink quantity counter as taught by Kobayashi et al.

The motivation for doing so would have been to more properly determine the amount of ink consumed by properly taking into account all sources of ink usage as suggested by page 3, lines 10-13 of Kobayashi et al.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cook US 6,155,664 in view of Duffield et al. US 4,432,005.

Cook discloses an ink jet recording apparatus as described in claim 1 as noted in the above 35 USC 102 rejection.

Cook fails to disclose that the ink cartridge stores an ink pack composed of a flexible material in which the ink is enclosed, an outer block member of the ink cartridge is airtight, and air compressed by an air compressor is supplied to a space defined between the ink pack and the outer block member and ink from the ink cartridge is supplied to the sub-tank under the compressed air.

Duffield discloses an ink cartridge storing an ink pack (14a) composed of a flexible material in which ink is enclosed, an outer block member (18) of the ink cartridge is airtight, air compressed by an air compressor (22) is applied to a space defined between the ink pack (14a) and the outer block member (18) and ink from the ink cartridge is supplied to sub-tank (8) under the compressed air (figure 1, column 4, lines 60-68).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the flexible ink pack and compressor mechanism of Duffield in the apparatus of Cook.

The motivation for doing so would have been to establish fine control over ink pressure during the ink refilling operation as suggested by column 3, lines 48-66 of Duffield et al.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cook US 6,155,664 in view of Dumery US 4,466,284.

Cook discloses an ink jet recording apparatus as described in claim 1 as noted in the above 35 USC 102 rejection.

Cook teaches utilizing that any one of a variety of ink level sensor types may be used (see column 12, lines 36-42).

Cook fails to disclose an ink level detector utilizing a float member, a permanent magnet attached to the float and a magnetoelectric element for outputting an electrical

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signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member.

Dumery discloses a liquid level detector utilizing a float member (57), a permanent magnet (50) attached to the float (57) and magnetoelectric elements (13) for outputting an electrical signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member (column 3, line 62 - column 4, line 7).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to utilize the magnetic float type liquid level sensor as disclosed by Dumery as the ink level sensor of Cook.

The motivation for doing so would have been to achieve ink level detection with a high resolution, low cost liquid level detector as taught by column 1, lines 47-51 of Dumery.

Allowable Subject Matter

6. Claim 5 is allowable as indicated in the prior office action.

Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

7. Applicant's arguments filed January 30, 2004 have been fully considered but they are not persuasive as to the rejected claims.

The applicant has argued that ink is not supplied based upon both of the ink consumption counter and ink detector in the Cook reference. The applicant has argued that Cook determines ink refill based on the consumption counter but not on the ink detector. The examiner disagrees.

In the flow chart shown in figure 6 of Cook the ink refill is carried out in step 178, detection by the ink detector is carried out in step 158 and detection by the ink consumption counter is carried out in step 168. An analysis of the flow chart indicates that when the consumption counter and the ink detector indicate different ink levels the operation will proceed to step 163 in which service of the sensor is indicated to a user. When both the counter and the detector indicate the same level the operation will proceed to step 164. If both the counter and detector indicate a non-low ink level the operation proceeds to step 165. If the counter and the detector indicate a low ink level the operation proceeds to step 170 and subsequently to step 178 (after the secondary ink level is checked). It is clear that only in the case when **BOTH** the ink detector and the counter indicate low ink levels the refill operation (step 178) will occur and in other cases either the procedures of steps 163 or 165 are accomplished.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet who may be reached at telephone number (571) 272-2150. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

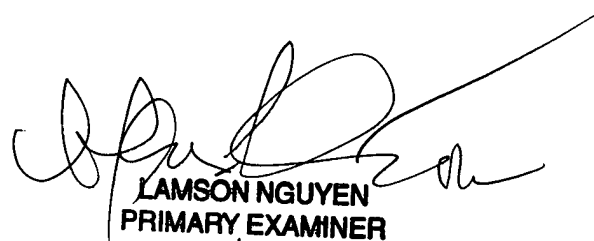
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier, Art Unit 2853, can be reached at (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Blaise Mouttet March 30, 2004

Bm 3/30/2004


LAMSON NGUYEN
PRIMARY EXAMINER
3/31/04